

CLAIMS

WHAT IS CLAIMED IS:

1. A system providing adaptive medical therapies utilizing a neural network based learning engine to a cardiac patient, the system comprising:

5 a cardiac device module for providing adaptive medical therapies to the patient, the cardiac device module comprises:

a cardiac device data collection module for collecting patient data associated with the cardiac health state of the patient's heart;

10 a cardiac therapy module for applying corrective medical therapies to the patient's heart upon detection of undesired health conditions; and

a runtime neural network module for processing collected patient data to determine the corrective medical therapies to be applied using the cardiac therapy module;

an artificial neural network processing module for training and validating the operation of a neural network, the artificial neural network processing module comprising:

15 a cardiac neural network training module for processing collected patient data to determine a set of operating coefficients used by the artificial neural network when determining optimal treatment therapies;

20 a cardiac device interface module for receiving collected patient data from the cardiac device module and for transmitting the set of operating coefficients used by the artificial neural network when determining optimal treatment therapies; and

collected patient data history data store for maintaining all of the patient collected data history and treatment therapies; and

a communications link between the cardiac device module and the artificial neural network processing module;

5 wherein the cardiac device runtime neural network module and the neural network training module implement identical networks of nodes.

2. The system according to claim 1 wherein the cardiac device module further comprises:

a collected patient data storage module for maintaining a copy of relevant collected patient data collected by the cardiac device data collection module; and

10 an artificial neural network processing module interface module for transmitting collected patient data from the cardiac device module and for transmitting the set of operating coefficients used by the artificial neural network when determining optimal treatment therapies.

3. The system according to claim 2, wherein the artificial neural network processing module interface module further receives the set of operating coefficients used by the artificial neural

15 network when determining optimal treatment therapies from the artificial neural network processing module.

4. The system according to claim 3, wherein the collected patient data comprises one or more data values associated with the current state of the patient's heart.

5. The system according to claim 4, wherein the one or more data values associated with the
20 current state of the patient's heart comprise data values associated with an A Rate, a V Rate, an A

Rate dispersion, a V Stability, an AV pattern, an NSR template, an arrhythmia template, sensed morphology a number of past attempts required to treat a given observed condition, an identity of a particular therapy that provided an effective treatment of an observed condition, and an identify of a particular therapy that provided an ineffective treatment of an observed condition.

- 5 6. The system according to claim 1, wherein the artificial neural network processing module further comprises:

 a user interface module for providing a medical technician with an ability to interact with the artificial neural network processing module and to input data associated with optimal treatment therapies into the artificial neural network processing module.

- 10 7. The system according to claim 6, wherein the artificial neural network processing module utilizes the cardiac device interface module for transmitting the set of operating coefficients used by the artificial neural network when determining optimal treatment therapies to the cardiac device module.

8. The system according to claim 1, wherein the communications link between the cardiac
15 device module and the artificial neural network processing module is used to transmit collected patient data and the set of operating coefficients used by the artificial neural network when determining optimal treatment therapies between the cardiac device module and the artificial neural network processing module.

9. The system according to claim 8, wherein the communications link utilizes an RF
20 communications channel.

10. The system according to claim 8, wherein the communications link utilizes an optical communications channel.